CONSOLIDATION IN THE US CREDIT UNION SECTOR:

DETERMINANTS OF FAILURE AND ACQUISITION

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Abstract

We examine the determinants of disappearance through liquidation or acquisition for US credit unions during the period 2001-06. The hazard of disappearance is inversely related to both asset size and profitability, and positively related to liquidity. Growth-constrained credit unions are less attractive acquisition targets, but are more likely to fail. Credit unions with low capitalization and those with relatively small loans portfolios are attractive as acquisition targets. We report unique empirical evidence of a link between technological capability and the hazard of disappearance. The absence of an internet banking capability rendered a credit union more vulnerable to acquisition, but did not affect the probability of failure.

Keywords: Credit unions, consolidation, acquisition, failure, technology

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1. INTRODUCTION

In recent years, technological change and deregulation have fundamentally transformed the financial services industry. Technology improvements in data collection, storage and processing capabilities have occurred, and costs of product development and service delivery have declined. Financial institutions are now able to trade more freely in their local markets, and often beyond. Consequently, they have also increased the range of products and services to customers. Increased competition from a myriad of financial institutions has led to an increased emphasis on efficiency and profitability.

Many financial institutions have responded to the changing competitive environment by expanding, either through internally generated growth, or through merger and acquisition. Growth has enabled banks to realize scale and scope economies, reduce labor and other variable costs, and reduce or eliminate operational inefficiencies. Many financial institutions have sought to diversify their revenue sources. As net interest margins have been subjected to increasing competitive pressure, resulting, generally, in a depression of earnings streams relative to costs, many financial institutions have focused on achieving growth from other, non-interest income sources. Consolidation via acquisition and merger has contributed significantly to a reduction in the number of financial institutions in many countries (Nolle, 1995; Berger et al., 1995; Berger et al., 1999; Amel et al., 2004; Jones and Critchfield, 2005; Goddard et al., 2007a). "(T)he extraordinary advance in communications and data processing technology over the last two decades is the single most powerful underlying force... driving the merger wave" (Broaddus, 1998, p5).

In many countries, the credit union sector (in common with the banking and insurance sectors) has also experienced a wave of consolidation. However, with relatively few exceptions (Fried et al., 1999; Ralston et al., 2001; Worthington, 2004), this increase in merger activity has remained unexplained. In this study, we seek to fill this gap by examining the determinants of merger activity

for the US credit union sector. Most previous studies of merger activity in financial services have neglected the role of technology. An important contribution of this paper is the incorporation of technology variables into a model of the determinants of the probability of acquisition or failure for financial institutions.

The rest of this paper is structured as follows. Section 2 outlines the structure of the US credit union sector. Section 3 reviews the theoretical and empirical literature on corporate failure, merger, and technology adoption, with particular emphasis on the financial services industry. Section 4 describes the data set, and develops an empirical model for the determinants of credit union acquisition or failure. Section 5 presents the results of the empirical analysis. Finally, Section 6 summarizes and concludes.

2. THE US CREDIT UNION SECTOR

Credit unions are not-for-profit financial cooperatives. Each credit union is governed by its members, who elect from within the membership unpaid volunteer officers and directors. Voting is on a one-member-one-vote basis, regardless of the size of each member's financial stake. At the end of 2006 there were 8,372 credit unions in the US, with a membership of 87 million and total assets of $710 billion. In recent years the asset and membership base of US credit unions has grown, but the number of credit unions has declined through consolidation. As credit unions have become larger and more sophisticated, there has been a gradual shift away from using volunteers for day-to-day operational needs and towards salaried employees. Credit unions serve a membership defined theoretically by a common bond (Goddard et al, 2002). The common bond might restrict membership to members of a local community, employees of a particular firm, or individuals with some other organizational affiliation (such as a church).[1]

[1] According to the American Bankers Association (2004), the 1998 Credit Union Membership Access Act resulted in erosion of the importance of the common bond, with federal credit unions permitted to add select employee groups (SEGs) to their fields of membership. In certain circumstances, a credit union's existing common bond designation may make it difficult, or inappropriate, to add SEGs. Some credit unions have converted from occupational to community common bonds with the objective of expanding their membership.

Growth in membership has also been accompanied by product diversification, particularly in the case of the larger credit unions (Goddard et al., 2007b). Many credit unions provide an array of retail financial services similar to those of banks and savings and loan associations. In addition, credit unions may also offer interest-bearing business checking accounts and commercial loans, agricultural loans and venture capital loans. Credit unions may also deal in investment products such as bankers' acceptances, cash forward agreements and reverse purchase transactions. These product offerings have further blurred the lines of demarcation between credit unions and mainstream financial services providers (Tokle and Tokle, 2000; Feinburg, 2001; Feinburg and Rahman, 2001; Hannan, 2003; Schmid, 2005).

Recently technological change has impacted heavily on the structure, operations and economics of the financial services industry. Information technology (IT) alters the ways in which customers can access services, mainly through automated distribution channels such as the internet, phone-based and other banking access channels. IT can also yield cost savings associated with the management of information (collection, storage, processing and transmission), and by substituting paper-based and labour-intensive procedures with automated processes[2] (Hernandez and Nieto, 2007; DeYoung et al., 2007).

3. CORPORATE FAILURE, MERGER AND TECHNOLOGICAL ADOPTION

In this section, we provide a selective review of academic literature on the determinants of corporate failure, the motives for merger and acquisition, and the adoption and diffusion of new technology. In

[2] Technological change in financial services can be classified under four main headings: Customer Facing Technologies; Business Management Technologies; Core Processing Technologies; and Support and Integration Technologies. Customer Facing Technologies include Automated Teller Machines (ATM), Electronic Funds Transfer at the Point of Sale (EFTPOS), Telephone Banking, Call Centres, Internet Banking, e-commerce and e-card business and Customer Relationship Management Systems (CRM). Business Management Technologies include Data Warehousing, Data Mining, Middleware, Credit and Risk systems. Core Processing Technologies include Cheque Processing, Statement Issuance, Interest and Charging Systems. Support and Integration Technologies include General Ledgers, Human Resources Systems, Finance Systems and Technology Support Systems.

each case, we focus primarily on literature that is relevant to financial services, and provide a few key citations from the broader industrial organization literature.

3.1 Corporate Failure

Academic research on the determinants of corporate survival or failure extends back to the 1960s. Beaver (1967) used a univariate model to assess the differences between surviving and non-surviving firms. Subsequently, multivariate models have been used to assess the usefulness of liquidity, profitability, risk and financial structure as predictors of survival or failure. Both discriminant analysis and discrete choice regression models have been employed (Altman, 1968, 1993; Ohlson, 1980; Shumway, 2001).

Several studies have examined the role of bank-specific, regulatory and regional economic conditions as determinants of bank failure (Sinkey, 1975; Demirguc-Kunt, 1989; Gajewski, 1989; Thomson, 1991; Wheelock and Wilson, 1995, 2000; Cole and Gunther, 1995, 1998; Kolari et al., 2002; Nuxoll, 2003; Nuxoll et al., 2003; King et al, 2005; and Lanine and Vander Vennet, 2006). Estrella et al (2000) find that capital ratios are useful predictors of US bank failure. Leverage ratios, which capture operational risk, interest rate risk and reputation risk, are better predictors of failure over short time periods than the more sophisticated risk-based capital ratios, which focus primarily on credit risk. An unadjusted capital to gross revenue measure, suggested by Shepheard-Walwyn and Litterman (1998), performs reasonably well in predicting bank failure. DeYoung (2003) notes that around 25% of US banks that were newly chartered during the 1980s have failed subsequently.

The rather limited evidence on credit union failure suggests that young, small and poorly capitalized credit unions are most likely to fail (Kharadia and Collins, 1981; GAO, 1991; Wilcox, 2005). Poor macroeconomic conditions also increased the probability of failure. In terms of the overall riskiness of credit unions relative to banks, the losses imposed on insurance funds appear to be lower for credit unions. For example, the (per dollar of insured deposit) losses over the period 1971-2004 for the Bank Insurance Fund (BIF) of the Federal Deposit Insurance Corporation (FDIC) and the

National Credit Union Share Insurance Fund (NCUSIF) were 0.073% and 0.018%, respectively (Wilcox, 2005).

3.2 Merger

Corporate finance theory summarises the motives for merger activity in any industry under the general headings of synergy, hubris and agency (Collins, 2003; Copeland and Weston, 2005). Synergy, the most common justification given by senior management for merger proposals, refers to the increased market power of the merged entity, and to the potential for cost savings. Cost savings may be realized through the exploitation of scale economies, vertical integration, or the adoption of more efficient production or organizational technology. Savings may be realized through the elimination of overlapping costs, by combining head office and various back office functions or branch networks. Scope economies, realized through the cross-selling of products and services, as in deals involving banks and insurance companies, may also be available. Mergers may allow the exploitation of certain accounting advantages, such as under-utilized tax shields. Another possible cost saving derives from the removal of inefficient management at the target institution.

The hubris hypothesis suggests that managers make mistakes in evaluating target firms, and overestimate the potential for synergy (Roll, 1986). Consequently, bidding firms tend to pay too much for the target. Finally, according to the agency hypothesis, acquiring managers deliberately overpay for their targets, because they benefit personally, even if the stock price and shareholder wealth is adversely affected. There may be greater prestige associated with managing a larger organization; promotion opportunities may be better; or merger may divert attention and allow senior managers to avoid dismissal if their institution has been performing poorly.[3]

[3] Gorton et al. (2006) develop a hybrid theory that combines managerial motives and a regime shift. They argue that managers benefit personally from operating the firm, and therefore have an incentive to keep the firm independent. However, if a regime shift increases the importance of economies of scale, managers find themselves under pressure to increase firm size, either for defensive or for strategic positioning reasons, leading to what is termed an eat-or-be-eaten scenario. “Our models show that in industries with economies of scale, firm size becomes the driving force for merger dynamics. Often this leads to profitable acquisitions. However, if a firm becomes very large and its manager’s private benefits are high, it may engage in unprofitable defensive acquisition. (Gorton et al., 2006, p4).

Empirical evidence on the motives for bank merger tends to confirm the importance of the synergy motive (Zhang, 1995; Grabowski et al., 1995; Rhoades, 1998; Wheelock and Wilson, 2000, 2004; Focarelli et al., 2002).[4] Banks with low earnings, low capital-to-assets ratios, high local market share, or which operate in urban areas, are more likely to be acquired (Hannan and Rhoades, 1987; Amel and Rhoades, 1989; Moore, 1997; Hadlock et al., 1999; Hannan and Piloff, 2006).

Studies of the impact of bank mergers examine either pre- and post-merger cost efficiency, or stock price reactions to merger announcements. Rhoades (1986) finds no difference between the performance of US banks that were acquired and those that were not, but using bank merger case studies, Rhoades (1998) finds some evidence of cost savings. Spindt and Tarhan (1992) find that the profitability of many merged banks improved in the years after merger. However, the view that realized post-merger cost efficiency gains are quite limited is prevalent in the empirical literature (Berger and Humphrey, 1992; Rhoades, 1993; Peristiani, 1997; DeYoung, 1997). This evidence is confirmed by analysts' estimates of projected cost savings associated with mergers (Houston et al., 2001). Recent empirical evidence suggests that information spillovers from previous mergers, and learning-by-doing within banks, have led to improved post-merger returns (DeLong and DeYoung, 2007).

Shaffer (1992) and Molyneux et al. (1996) evaluate the impact of mergers by calculating potential cost savings arising from hypothetical, simulated mergers, using cost functions estimated from real data. The majority of simulated mergers lead to increases in costs. Some studies that focus on profit efficiency report post-merger benefits (Akhavein et al., 1997; Berger, 1998). Cornett et al. (2006) report that geographically focused mergers provide both revenue enhancements and cost savings, while Park and Pennacchi (2007) report that mergers involving large multimarket banks tend to enhance competition in loans markets, but damage competition in deposit markets.

Overall, the empirical evidence on bank mergers suggests there is often little improvement in the efficiency or performance of the merged entity. This suggests that the hubris and agency motives

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[4] Some non-bank studies also report evidence in support of the hubris and agency hypotheses (Berkovitch and Narayanan, 1998; Rossi and Volpin, 2004). Cross-country merger studies suggest that differences in accounting standard and shareholder protection are significant drivers of shareholder activities (Rossi and Volpin, 2004; Buch and DeLong, 2004; and Pozzolo and Focarelli, 2007).

for merger may be relevant; or that synergy derives more from enhanced market power than from cost savings. These explanations are not mutually exclusive: increased market power might be reflected in senior mangers directing a larger proportion of revenues towards executive salaries or fringe benefits; or large banks might choose to adopt risk-averse strategies, as the 'quiet-life' hypothesis (Hicks, 1935; Berger and Hannan, 1998). This could explain why increased market power resulting from merger is not reflected in increased profitability or shareholder value.

Evidence on the motives for credit union mergers is limited, but three studies are noteworthy. Fried et al. (1999) finds that in the US, acquiring credit unions benefit more when they and the target credit union have different levels of profitability, different numbers of select employee groups, and when one of them has a community charter. This implies that the acquired credit union can exploit the complementarities offered by the merger. On average, members of acquiring credit unions experienced no deterioration in service provision post-merger, while members of acquired credit unions experienced improvements of at least three years' duration.

For Australian credit union mergers, Ralston et al. (2001) find mixed evidence of post-merger gains and losses in technical and scale efficiency. The highest gains were found where pre-merger efficiency scores were low for both partners. This is inconsistent with the notion that efficiency gains are realized by transferring assets from inefficient managers to efficient managers. Mergers do not appear to generate efficiency gains greater than those that non-merging credit unions are able to achieve through internal growth. Finally, in a study of the determinants of merger for Australian credit unions, Worthington (2004) finds that asset size and quality, managerial efficiency; earnings and liquidity are all significant drivers of merger activity.

3.3 Technology adoption and diffusion

Technological change might provide the impetus for industry consolidation. Mergers take place when managers respond to technological or regulatory shocks, which change the industry's cost and demand conditions (Gort, 1969; Mitchell and Mulherin, 1996). In the case of major technology shocks such as the IT revolution of the late-20th century, a merger wave can spread across many

industries simultaneously. At the same time, merger activity might serve as an important vehicle for the diffusion of new technology (Mansfield, 1961, 1969; Damanpour, 1991, 1992). Mergers play a role in the diffusion process by speeding up the transmission of new information, and spreading the risks associated with new technologies over larger volumes of output.[5]

In banking, several studies have examined patterns of adoption of innovations, including: Auto Teller Machines (Hannan and McDowell, 1984; 1986; Saloner and Shepard, 1995); Automated Clearinghouse Settlement Systems (Gowrisankaran and Stavins, 2004); credit scoring technologies (Akhavein et al., 2005); and Real Time Gross Settlement Systems (Bech and Hobijn, 2006). Furst et al. (2002) use multivariate logit regressions to identify factors driving the adoption of internet banking. Banks that incurred high fixed costs relative to net operating revenues, were members of a bank holding company, or were located in an urban area, were more likely adopters. Courchane et al. (2002) examine the decision to invest in internet banking using a two-stage real options framework. Bank size, industry concentration and bank location were significant determinants of the probability of adoption. Nickerson and Sullivan (2004) suggest banks are more likely to adopt internet banking where uncertainty over the level of demand is low. Sullivan and Wang (2005) find that the adoption of internet banking was slower in US states where average income is low, where there is a scarcity of internet access, where financial institutions are older, and where average bank size is smaller. Fuentes et al. (2006) find that banks are more likely to adopt transactional internet banking when competition is intense, and when rival banks have already adopted.

[5] Smythe (2001) examines mergers in US manufacturing industries between 1895-1904 using a Schumpeterian framework. The turn-of-the-century merger movement was " ... the consequence of an aggressive, unremitting technological competition that concurrently swept across a wide swathe of American industries in the wake of the technological innovations clustered at the end of the nineteenth century. Because the implementation of these innovations required significant capital investments, and because the outcome of the competitive process was highly uncertain, firms' incentives to cooperate with their rivals were increased at the same time that sustaining such cooperation at arms length was made impossible. The only way of realizing the benefits of cooperation, therefore, was by internalizing it through horizontal mergers. Once realized, the cooperation helped facilitate the capital investments necessary to implement the new technologies" (Smythe, 2001, p254).

4. DATA AND MODEL SPECIFICATION

4.1 Data and sample selection

In this section, we describe the data that are used below to estimate hazard functions for US credit union disappearances through acquisition or failure. We also discuss the selection of covariates for the hazard functions. The credit union balance sheet and income statement data are compiled from the '5300 Call Reports' published by the National Credit Union Association (NCUA). Semi-annual data are available for the period June 2001 to June 2006, providing a maximum of 11 time-series observations on each credit union.

The covariates of the hazard functions control for asset size, market penetration, age, profitability, liquidity, risk, asset mix, asset quality, managerial efficiency and technological capability. In addition, we include controls for the charter and common bond characteristics of each credit union, distinguishing between state and federally chartered credit unions, and between single and multiple common bond credit unions.

The complete list of covariate definitions is as follows:

Size:	LASSET = natural logarithm of total assets
Market penetration:	MEMPOT = actual members / potential members
Age:	LAGE = natural logarithm of (current year – year of formation)
Profitability:	ROA (return on assets) = net income / total assets
Liquidity:	LIQ = (cash on hand + cash on deposit + cash equivalents) / total assets
Capital adequacy:	CAPASS (capital-to-assets ratio) = net worth / total assets
Asset mix:	LOANASS = total loans / total assets
Asset quality:	NONPER = non-performing loans / total loans
Efficiency:	NINTASS = non-interest expenses / total assets
Technological capability:	
	TECH1 = 0-1 dummy identifying credit unions with an informational website

	TECH2 = 0-1 dummy identifying credit unions with an interactive website
	TECH3 = 0-1 dummy identifying credit unions with a transactional website
Charter type:	FED = 0-1 dummy identifying federally chartered credit unions
Common bond:	MULT = 0-1 dummy identifying multiple common bond credit unions

For credit unions that disappeared, NCUA provide a three-way classification by mode of disappearance, as follows: (i) acquisition; (ii) liquidation; and (iii) purchase and assumption (P&A) orders. Acquisition refers to the case where the acquiring credit union absorbs all of the assets and liabilities of the acquired credit union. Under the terms of the Federal Credit Union Act (section 120 and section 207), NCUA can place a credit union into liquidation, if it deems the credit union to be bankrupt or insolvent. NCUA can also place a solvent credit union into involuntary liquidation for violation of the terms its charter or breach of NCUA regulations. P&A is similar to acquisition, except it takes place after a credit union has entered liquidation, usually because the credit union is financially unsound. The purchasing credit union acquires specified assets and liabilities, with the rest covered by the insurance fund (NCUSIF).[6]

For June 2001, NCUA report data for 10,269 credit unions. We eliminated from the sample a number of credit unions for which data on any variable were missing for one or more subsequent six-monthly time periods up to and including June 2006, and the credit union concerned was not reported as either acquired, liquidated or subject to a P&A order within the same period. We also eliminated from the sample any credit union that reported an extreme or unbelievable value for any of the variables for any six-monthly period. We also eliminated a small number of credit unions for which the year of formation was not reported. Trimming the sample in this way resulted in the loss of exactly 700 credit unions (6.8% of the total that are reported for June 2001). The final sample comprises 9,569 credit unions that were live in June 2001 and reported complete and believable data either up to the recorded date of disappearance, or up to and including June 2006 in the case of non-

[6] The NCUA delegates responsibility for managing liquidation or P&A to the Asset Management and Assistance Centre (AMAC), which manages the repayment of insured deposits (shares), sale of loans, liquidation of assets and cancellation of charters.

disappearing credit unions. Of the 9,569 sample credit unions that were live in June 2001, 7,949 survived until December 2006 and 1,620 disappeared between June 2001 and December 2006.

In addition to the three modes of disappearances described above, NCUA provides a coding for each disappearing credit union according to the reported reason for disappearance. Table 1 provides a two-way classification of the 1,620 sample credit unions that disappeared, by mode of disappearance (acquisition, liquidation or P&A), and by reported reason for disappearance. For a very large majority of the sample credit unions that disappeared (96.9% of all disappearances), the mode of disappearance is acquisition. By comparison, the proportions of disappearances through liquidation (2.3%) and through P&A (0.8%) are very small. This suggests that it may be difficult to identify separate hazard functions for disappearance through merger, liquidation and P&A. Nevertheless, despite the small numbers in the latter two categories, in Section 5 we report a competing risks model in which these two categories are combined, and separate hazard functions are estimated for disappearance due to merger, and disappearance due to either liquidation or P&A.

The classification according to the reported reason for disappearance produces a more balanced subdivision. In Section 5 we also report an alternative competing risks model based on the reported reasons for disappearance, which are grouped into three broad categories: (i) financial or managerial difficulties (21.5% of all disappearances); (ii) expansion (27.5%); and (iii) reorganization and restructuring (51.0%).

4.2 Choice of hazard function covariates

In the rest of Section 4, we discuss the theoretical basis for the selection of covariates for the hazard functions for credit union disappearances, and we comment on the sample summary statistics for each of the covariates. The summary statistics are reported in Tables 2 to 5. Table 2 reports sample means, standard deviations and correlation coefficients for the time-varying covariates of the hazard function model, excluding the technology covariates. In calculating these summary statistics, the semi-annual observations on each sample credit union from the period June 2001 to June 2006 (inclusive) are pooled. Accordingly, each sample credit union contributes up to 11 observations to the

summary statistics. Table 3 reports summary statistics for the non-time-varying covariates. These statistics are reported separately for all sample credit unions, and for the credit unions that disappeared. Table 4 reports sample mean values for the time-varying covariates in each semi-annual period, calculated using the data for all surviving credit unions in each period. Table 5 reports the sample mean values for the time-varying covariates for credit unions that disappeared, calculated using only the data from the last-reported observation on each disappearing credit union.

The relationship between asset size and performance is widely documented in the theoretical and empirical banking literature. Economies of scale in screening, lending and monitoring may render large financial institutions better able to judge cost and demand conditions. Accordingly, it seems likely that smaller credit unions are at greater risk of disappearance than larger ones, and we expect a negative coefficient on LASSET in the hazard functions. Table 4 indicates that the average asset size of the sample credit unions increased steadily throughout the sample period, while Table 5 indicates that the credit unions that disappeared were much smaller on average than those that survived.

Age might be correlated with a number of unobservable managerial characteristics that could impact on the probability of disappearance, but we have no specific prior concerning the sign of the coefficient on LAGE. Table 3 suggests there was little difference between the age profile of the sample as a whole, and that of the credit unions that disappeared.

The market penetration measure shows the number of actual members of the credit union as a proportion of the potential membership determined by the terms of the credit union's charter. High market penetration indicates that a credit union has already captured most of its potential membership, and further growth under the credit union's present common bond designation may be constrained. In this case, absorption into another credit union with a broader common bond designation through acquisition might eliminate this growth constraint, and we would expect a positive coefficient on MEMPOT in the hazard function. Alternatively, a growth-constrained credit union might represent an unattractive target to a potential acquirer, in which case a negative coefficient might be expected. At the start of the sample period, credit unions that disappeared had slightly higher average values of MEMPOT than the sample as a whole (Tables 4 and 5). This difference appears to have narrowed over the course of the sample period.

It seems likely that credit unions with poor profitability are more likely to disappear than those with high profitability; therefore we expect a negative coefficient on ROA in the hazard function. In fact, the average ROA of disappearing credit unions immediately before they disappeared was always negative, and considerably lower than the average ROA of the sample as a whole. A highly liquid credit union might be at greater risk of being acquired than an illiquid one, because high liquidity makes it an attractive target for a cash-strapped acquirer, or because it may be forgoing an investment return on the assets concerned. Therefore we expect a positive coefficient on LIQ. According to the summary statistics, the average LIQ of the disappearing credit unions is higher than the average for the sample as a whole.

In common with other financial institutions, credit unions are subject to capital requirements.[7] We might expect either a positive or a negative relationship between CAPASS and the probability of acquisition. A positive relationship might be expected if a credit union holds excess capital because it has limited opportunities for growth. This would make a highly capitalized credit union an attractive target to a growth-oriented acquirer. Alternatively, an acquirer might be poorly capitalized, and seeking to improve its capitalization by acquiring a well-capitalized credit union. The summary statistics indicate that for 10 of the 11 semi-annual periods, the average value of CAPASS is slightly higher for the credit unions that disappeared than for the sample as a whole.

Conversely, a negative relationship between CAPASS and the hazard of disappearance might be expected if the acquired credit union's high capitalization is a proxy for efficiency, suggesting limited scope for further efficiency gains following a merger. According to Hannan and Piloff (2006), acquirers might prefer a high level of leverage because this enables them to maximize post-merger performance gains relative to the cost of achieving those gains. For any given asset size, the purchase

[7] Credit unions cannot raise capital as easily as other financial institutions, because they cannot issue equity. However, the tax-exempt status of any capital the credit union raises internally through retained earnings represents a form of subsidy to shareholders. This has been justified as beneficial for tackling financial exclusion, on the grounds that credit unions serve low-income clients; but a 2001 Federal Reserve survey of consumer finance suggested that credit unions do not actually serve a higher proportion of such clients than other financial institutions. Consequently it has been suggested that credit unions should be taxed on the same basis as banks (Chimura Economics and Analytics, 2004; Tatom, 2005). Recently, US Congress has asked the NCUA to collect data to identify the types of services provided to members, the income distribution of members, and levels of executive compensation and benefits to board members (US Government Accountability Office, 2005; NCUA, 2006).

price is likely to be lower if the target credit union is poorly capitalized. Therefore a less capitalized target offers the acquirer the prospect of achieving a given performance gain for a lower investment.

Because loans are typically less liquid and more risky than other assets, a credit union with a high loans-to-assets ratio might be at greater risk of failure. In this case, we would expect a positive coefficient on LOANASS in the hazard function. Alternatively, credit unions with relatively small loans portfolios might be vulnerable as targets for acquirers who may believe they can earn a higher return by increasing the size of the loans portfolio. The summary statistics indicate that average values of LOANASS are generally lower for the disappearing credit unions than for the sample as a whole.

A high ratio of non-performing loans to total loans should be a relevant indicator of potential insolvency; therefore we expect a positive coefficient on NONPER. The average values of NONPER are higher for the disappearing credit unions than for the sample as a whole. Completing the list of company accounts covariates, the ratio of non-interest expenses to total assets is employed as a crude measure of cost efficiency. On the grounds that inefficient credit unions are likely to be more vulnerable to failure or acquisition, we would expect a positive coefficient on NINTASS. However, the average values of NINTASS are generally lower for the disappearing credit unions than for the sample as a whole (although the difference does not appear large relative to the random variation in NINTASS for the disappearing credit unions).

The increasing penetration in recent years of internet technology into all aspects of commercial activity provides opportunities for studying the interactions between technology adoption and diffusion, and other strategic decisions of commercial organizations, including merger and acquisition in the present case. Our prior is that a credit union that is backward in the adoption of internet technology might be at greater risk of acquisition by an institution whose managers have the requisite technological capability, and might be able to earn a higher return on assets than the backward credit union's current managers.

We identify three indicators of internet technology adoption, dependent on the existence and capabilities of the credit union's website. At the first (lowest) level, an informational website displays general information on interest rates, and contract details. At the second (intermediate) level, an interactive website also allows members to request information on share and loan balances, and to

request statements. It also accepts applications for membership, loans or share accounts. Finally, at the third (highest) level, a transactional website also allows members to complete transactions such as paying bills, make loan payments or deposits, and transfer funds between accounts. In accordance with the preceding discussion, we expect negative coefficients on the dummy variables TECH1, TECH2 and TECH3 in the hazard function. The summary statistics indicate that credit unions that disappeared were much less likely to have developed websites by the time of disappearance than the sample as a whole (Tables 4 and 5).

Finally, only those individuals who fall within a credit union's common bond (field of membership) can use the credit union's services. Both state governments and the federal government charter credit unions.[8] In the hazard functions, the dummy variable MULT distinguishes between single and multiple common bond credit unions, and the dummy variable FED does the same for state chartered and federally chartered credit unions. The summary statistics suggest that a relatively high proportion of the disappearing credit unions were single common bond, but the proportions of disappearances that were state chartered and federally chartered were similar to those for the sample as a whole.

5. ESTIMATION METHOD AND RESULTS

5.1 Estimation method

The estimation of hazard functions for the disappearance of US credit unions through acquisition or failure is based on the method used by Wheelock and Wilson (2000) to model the determinants of failure and acquisition for US banks. The empirical model for the hazard of disappearance is based on the Cox (1972) proportional hazard model with time-varying covariates. In several of the estimations that are reported below, we model probabilities for the disappearance of credit unions, treating all disappearances as identical events and ignoring the mode and reported

[8] The laws governing state-chartered credit unions' common bond limits and powers tend to be more liberal than the corresponding federal laws. State chartered credit unions may therefore assume more risk or adopt more aggressive portfolio management techniques. However, state chartered credit unions are unable to branch across state lines, and are therefore subject to a significant constraint on their growth.

reason for disappearance. In other estimations, we model separate probabilities using a competing risks model. In the latter, the alternative modes of disappearance or reported reasons for disappearance are treated as independent events, and the observations on a credit union that disappeared through one event are treated as right-censored in the estimations of the hazard for disappearance through any of the other events.

The hazard function expressing the probability that credit union i disappears through event k between time t and time t+1, conditional on a vector of covariates specific to credit union i at time t that influence the probability of event k, denoted $x_{i,k}(t)$, is modelled as follows:

$$\lambda_{k,i}(t \mid x_{k,i}(t), \beta_k) = \bar{\lambda}_k(t) \exp(x_{k,i}(t)'\beta_k)$$

$\bar{\lambda}_k(t)$ denotes the baseline hazard, and β_k is a vector of coefficients to be estimated. The time-index t is measured in calendar time elapsed since the first observation, for June 2001. Since all sample credit unions were in existence in June 2001, calendar time and duration until disappearance are equivalent for all observations in the data set. We let R_t denote the set of credit unions that are in existence at time t and at risk of disappearance between t and t+1, and we let $D_{k,t}$ denote the set of $d_{k,t}$ credit unions that disappear through event k between time t and time t+1. The contribution to the partial likelihood function of credit union i, which disappears through event k between t and t+1, is:

$$\exp(x_{k,i}(t)'\beta_k) / \sum_{j \in R_t} \exp(x_{k,j}(t)'\beta_k)$$

We note that $\bar{\lambda}_k(t)$ drops out when the partial likelihood function is formed. Therefore $\bar{\lambda}_k(t)$ is not parameterized explicitly, and the proportional hazards model is described as semi-parametric. The log-partial likelihood function is:

$$\ln[L(\beta_k)] = \sum_{t=1}^{T} [\sum_{i \in D_{k,t}} x_{k,i}(t)'\beta_k - d_{k,t} \ln\{\sum_{j \in R_t} \exp(x_{k,j}(t)'\beta_k)\}]$$

All estimations are carried out using the survival analysis routines available in *Stata* 9.

5.2 Hazard function estimation results

Table 6 reports the hazard function estimation results. In Equation I, the hazard is for disappearance due to either merger, liquidation or purchase and assumption (P&A). Equations II and III comprise a competing risks model, in which separate hazards are estimated for disappearance due to merger (Equation II) and liquidation or P&A (Equation III). Equations IV to VI comprise an alternative competing risks model, in which disappearances due to either merger, liquidation or P&A are subdivided according to the reported reason for disappearance. As noted in Section 4, the reported reasons for disappearance are: financial or managerial difficulties; expansion; and reorganization or restructuring. Equations VII to VIII repeat the estimation in Equation I, using only the data for state and federally chartered credit unions, respectively. Finally, Equations IX and X repeat the estimation in Equation I, using only the data for single and multiple common bond credit unions, respectively.

The anticipated inverse relationship between asset size and the hazard of disappearance is evident in all of the hazard function estimations reported in Table 6. The coefficients on LASSET are negative and strongly significant coefficients in all 10 equations. Therefore subdivision of the sample by mode of disappearance, by reported reason for disappearance, or by charter or common bond, does not appear to affect this strong underlying relationship between size and the hazard of disappearance.

The coefficient on MEMPOT is negative and significant in Equation I, indicating that the closer is the credit union's membership to its maximum, the less likely is the credit union to disappear. This does not support the hypothesis that acquisition is used as a means for eliminating a constraint on growth, but it is consistent with the hypothesis that acquiring credit unions prefer targets with higher growth potential. Further evidence in support of this interpretation is found in Equations II, III and V. The coefficient on MEMPOT in Equation II (hazard of disappearance due to acquisition) is negative and significant, but the coefficient in Equation III (liquidation or P&A) is positive and significant (at the 10% level). In other words, credit unions that are growth-constrained are less likely

to be attractive acquisition targets, but are more likely to disappear due to liquidation or P&A. The negative coefficient on MEMPOT in Equation V (disappearance for reasons associated with expansion) is large in absolute terms and highly significant. Credit unions that are growth-constrained naturally make less attractive targets when expansion is the motive for acquisition.

The coefficient on LAGE in Equation I is positive and significant, suggesting that older credit unions are at greater risk of disappearance. This pattern is repeated in most of the other estimations, although not all of these coefficients are significant.

The anticipated inverse relationship between profitability and the hazard of disappearance is evident throughout Table 6. The coefficients on ROA are negative and strongly significant coefficients in all except Equation III (hazard of disappearance due to liquidation or P&A). The insignificant coefficient in the latter case may perhaps reflect the relatively small number of disappearances in this estimation. In general, and as is also the case with the size covariate, subdivision of the sample does not seem to affect this strong underlying relationship between profitability and the hazard of disappearance. Similarly, a positive relationship between liquidity and the hazard of disappearance is evident throughout Table 6, with only one insignificant coefficient reported, in Equation III. These results are consistent with the hypotheses that highly liquid credit unions tend to make attractive targets, perhaps because they generally fail to realize an adequate return on their assets. We note that Table 2 reports a negative correlation between ROA and LIQ.

The coefficients on CAPASS are negative and significant in all equations except Equation III (hazard of disappearance due to liquidation or P&A), where the coefficient is positive and significant. These results lend support to the explanations for a negative relationship between CAPASS and the hazard of acquisition advanced by Hannan and Piloff (2006): namely, that high capitalization is a proxy for efficiency, and is indicative of limited scope for post-merger efficiency gains; or low capitalization reduces the purchase price and increases the attractiveness of the target. On the other hand, highly capitalized credit unions appear to be at greater risk of disappearance due to liquidation or P&A.

Most of the estimated coefficients on NONPER reported in Table 6 are insignificant, and there is a mix of positively and negatively signs. This seems surprising, because Tables 4 and 5

suggest the proportion of non-performing loans was consistently higher for the disappearing credit unions than for the sample as a whole. The explanation may lie in Table 2, which reports relatively high correlation coefficients between NONPER and several other covariates (ROA, LIQ, CAPASS and LOANASS in particular). After controlling for the effects of these other factors on the hazard of disappearance, any apparent effect from NONPER drops out in most cases. One exception is VII (hazard of any disappearance for any reason, state chartered credit unions only), in which the coefficient on NONPER is positive and significant as anticipated.

The coefficients on LOANASS are predominantly negative and significant, with the exception of the coefficient in Equation IV (disappearance for reasons associated with financial or managerial difficulties), for which the coefficient is positive but insignificant. In general, the estimation results are consistent with the hypothesis that credit unions with relatively small loans portfolios are vulnerable as targets to acquirers who may anticipate earning a higher return on assets.

The coefficient on NINTASS in Equation I is positive and significant. This seems consistent with the interpretation of the ratio of non-interest expenses to assets as a managerial inefficiency measure, and the hypothesis that inefficient credit unions are more vulnerable to acquisition or failure. Although no such pattern is apparent in the sample averages reported in Tables 4 and 5, the pattern becomes apparent in the multivariate model after controlling for other covariates. However, only 3 of the 9 corresponding coefficients in Equations II to X are also positive and significant, so any such effect does not appear to be particularly robust.

The coefficients on the internet banking covariates TECH1-TECH3 in Equation I are negative and significant. The absolute values of these coefficients are consistent with the hypothesis advanced in Section 4: credit unions with no website are at the highest risk of disappearance, followed by those with informational, interactive and transactional websites respectively, in the anticipated order. The corresponding coefficients are insignificant in Equation III (disappearance due to liquidation or P&A). In all of the other equations, the coefficients on TECH3 are significant, as are many of the coefficients on TECH1 and TECH2. Equation II in particular lends support to the hypothesis that the absence of an internet banking capability renders a credit union more vulnerable to acquisition, presumably by acquiring managers who have the technological capability and perceive

that they can earn a higher return from the target credit union's assets. According to Equation III, however, the absence of an internet banking capability did not significantly increase the hazard of disappearance through liquidation or P&A.

Finally, the coefficient on FED in Equation I suggests that after allowing for the other controls, the hazard of disappearance was higher for state chartered than for federally chartered credit unions. The same pattern is evident in some but not all of the other estimations. In general the coefficients on MULT suggest there was little difference in the hazard between single and multiple common bond credit unions. Therefore the higher proportion of disappearances among single common bond credit unions shown in Table 3 seems to be explained by the other covariates, and drops out of the multivariate model. In general, the individual estimations for state and federally chartered credit unions, and for single and multiple common bond credit unions, reported in Table 6 as Equations VII to X, are quite similar to Equation I. The determinants of the hazard of disappearance do not appear to vary greatly by charter type or by common bond type.

6. CONCLUSION

In recent years, the US credit union sector has undergone a wave of consolidation. With a few exceptions, however, this increase in merger activity has remained largely unexplained in the academic literature. In this study we have sought to fill this gap, by examining the determinants of disappearance through liquidation or acquisition for US credit unions. Most previous studies of merger activity in financial services have largely neglected the role of technology. An important contribution of this paper has been the incorporation of technology variables into a model of the determinants of the probability of acquisition or failure for financial institutions.

In common with several other financial services sector merger or failure studies, we have found evidence of a strong inverse relationship between asset size and the hazard of credit union disappearance. Credit unions that are growth-constrained are less likely to be attractive acquisition targets, but are more likely to disappear through liquidation or P&A (purchase and assumption). Older

credit unions are at slightly greater risk of disappearance, although the empirical link between age and the hazard of disappearance is not particularly strong or robust.

There is a strong inverse relationship between profitability and the hazard of disappearance. The average ROA of credit unions that disappeared for the six-monthly period immediately preceding disappearance was always negative. Highly liquid credit unions appear to be attractive acquisition targets, perhaps because of the accessibility of their assets in liquid form, or perhaps because they have a tendency not to realize an adequate return on their assets.

Credit unions with low capitalization are at greater risk of disappearance. This could be because poorly capitalized credit unions have been inefficiently managed, and offer acquirers scope for introducing efficiency gains. Alternatively, it could be that low capitalization reduces the purchase price and therefore increases the attractiveness of the target to the acquirer. Highly capitalized credit unions appear to be at greater risk of failure through liquidation or P&A.

Although the credit unions that disappeared had a higher proportion of non-performing loans, the share of non-performing loans in the loans portfolio does not appear to be an important factor in determining the hazard of disappearance, after controlling for other factors such as profitability and liquidity. Credit unions with relatively small loans portfolios appear to be attractive targets for acquirers who may believe they can earn an improved return in such cases. Using the ratio of non-interest expenses to assets as a crude managerial efficiency measure, there is some evidence that inefficient credit unions are more vulnerable to acquisition or failure, although this relationship does not appear to be particularly strong or robust.

Finally, this paper has presented what we believe to be unique empirical evidence of a link between technological capability and the hazard of disappearance through acquisition in financial services. During the period 2001-06, when there was sustained growth in the uptake of internet technology, credit unions with no website were at the highest risk of disappearance, followed by those with informational, interactive and transactional websites. In other words, the risk of disappearance decreased as the level of website sophistication and capability increased. We therefore find support for the hypothesis that the absence of an internet banking capability renders a credit union more

vulnerable to acquisition, presumably by acquiring managers who have the technological capability and perceive that they can earn a higher return from the target credit union's assets.

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Table 1 Classification of sample credit unions that disappeared, June 2001 to December 2006

Stated reason for disappearance	Mode of disappearance			
	Acquisition	Liquidation	P&A	Total
1. Financial or managerial difficulties				
Lack of sponsor support	53	10	2	65
Loss/declining membership	48	13	0	61
Poor management	15	2	1	18
Poor financial condition	120	3	5	128
Lack of growth	32	5	0	37
Inability to obtain officials	36	4	0	40
2. Expansion				
Expanded services	445	0	0	445
3. Reorganization or restructuring				
Conversion to or merger with FCU	417	0	0	417
Conversion to or merger with FISCU	388	0	0	388
P&A with FCU	2	0	2	4
P&A with FISCU	1	0	3	4
Conversion to or merger with NFICU	9	0	0	9
Corporate restructuring	4	0	0	4
Total	1570	37	13	1620

Table 2 Summary statistics: Time-varying covariates

	Mean	St. Dev.	Correlation coefficients						
			ASSET	MEMPOT	ROA	LIQ	CAPASS	LOANASS	NONPER
ASSET	64.9	333.3	-	-	-	-	-	-	-
MEMPOT	.4671	.2703	-.0569	-	-	-	-	-	-
ROA	.00289	.01177	.0284	-.0045	-	-	-	-	-
LIQ	.1516	.1384	-.0916	.0823	-.0599	-	-	-	-
CAPASS	.1366	.0613	-.0879	.1902	.0462	.1388	-	-	-
LOANASS	.5745	.1799	.0678	-.1475	.0453	-.3039	-.2086	-	-
NONPER	.0235	.0480	-.0660	.0507	-.1214	.2341	.1736	-.1676	-
NINTASS	.00393	.00616	.0521	-.2049	.2411	-.0203	-.1375	.1592	-.0586

Table 3 Summary statistics: Non-time-varying covariates

	All sample credit unions	Disappearing credit unions
Distribution by charter type		
State charter	.3881	.4019
Federal charter	.6119	.5981
Distribution by common bond type		
Single common bond	.5016	.6025
Multiple common bond	.4984	.3975
Distribution by year of formation		
- 1930	.0202	.0111
1931-1940	.2031	.1562
1941-1950	.1128	.1136
1951-1960	.3307	.3364
1961-1970	.1896	.2093
1971-1980	.1038	.1333
1981-	.0400	.0401

Table 4 Mean values of time-varying covariates by observation: All sample credit unions

	Number	ASSET	MEMPOT	ROA	LIQ	CAPASS	LOANASS	NONPER	NINTASS	TECH0	TECH1	TECH2	TECH3
Jun-01	9569	47.2	.5171	.00387	.1552	.1396	.6179	.0226	.00363	.5887	.1691	.0609	.1813
Dec-01	9415	50.3	.5105	.00283	.1582	.1378	.6005	.0244	.00364	.5584	.1727	.0574	.2116
Jun-02	9254	55.0	.5021	.00270	.1637	.1319	.5682	.0227	.00329	.5289	.1683	.0500	.2529
Dec-02	9131	58.0	.4940	.00323	.1566	.1348	.5701	.0250	.00380	.5010	.1656	.0449	.2885
Jun-03	8976	63.4	.4859	.00314	.1885	.1307	.5381	.0243	.00364	.4719	.1614	.0412	.3254
Dec-03	8818	65.8	.4751	.00213	.1637	.1333	.5525	.0250	.00390	.4520	.1558	.0388	.3534
Jun-04	8676	69.7	.4659	.00278	.1567	.1325	.5452	.0228	.00383	.4310	.1453	.0393	.3844
Dec-04	8497	72.6	.4542	.00227	.1412	.1363	.5638	.0236	.00427	.4085	.1424	.0377	.4114
Jun-05	8363	76.3	.4459	.00303	.1315	.1379	.5680	.0224	.00425	.3866	.1360	.0379	.4396
Dec-05	8208	79.1	.4382	.00220	.1206	.1434	.5954	.0239	.00468	.3701	.1156	.0385	.4758
Jun-06	8077	82.8	.4309	.00345	.1232	.1454	.5973	.0209	.00448	.3509	.1070	.0366	.5055

Note:
TECH0 is the proportion of sample credit unions with no website. TECH1 is the proportion with an informational website only. TECH2 is the proportion with an interactive website. TECH3 is the proportion with a transactional website.

Table 5 Mean values of time-varying covariates by observation: Sample credit unions that disappeared during the subsequent six-month period

	Number	ASSET	MEMPOT	ROA	LIQ	CAPASS	LOANASS	NONPER	NINTASS	TECH0	TECH1	TECH2	TECH3
Jun-01	154	11.7	.5386	-.00559	.1975	.1603	.5782	.0446	.00267	.8182	.0909	.0195	.0714
Dec-01	161	5.4	.5545	-.01277	.2179	.1492	.5530	.0564	.00270	.8509	.0683	.0124	.0683
Jun-02	123	7.3	.5547	-.00565	.2543	.1425	.5419	.0408	.00238	.8130	.0732	.0407	.0732
Dec-02	155	10.6	.5085	-.00797	.2369	.1449	.5111	.0614	.00346	.7742	.1226	.0387	.0645
Jun-03	158	9.4	.5002	-.01203	.2978	.1441	.4710	.0624	.00274	.7911	.1076	.0380	.0633
Dec-03	142	9.5	.5101	-.01052	.2317	.1392	.5014	.0594	.00256	.7465	.1338	.0211	.0986
Jun-04	179	6.8	.4954	-.00475	.2711	.1488	.4671	.0504	.00434	.7430	.0894	.0223	.1453
Dec-04	134	8.3	.4505	-.01065	.2210	.1420	.5767	.0454	.00324	.7239	.1418	.0299	.1045
Jun-05	155	12.4	.4401	-.00860	.2273	.1372	.5146	.0428	.00295	.6774	.0839	.0194	.2194
Dec-05	131	9.4	.4994	-.01466	.1937	.1504	.5408	.0531	.00442	.5802	.1679	.0382	.2137
Jun-06	128	32.0	.4412	-.01744	.1946	.1536	.5165	.0354	.00192	.6406	.0938	.0313	.2344

Note:
TECH0 is the proportion of sample credit unions that disappeared during the subsequent six-month period with no website. TECH1 is the proportion with an informational website only. TECH2 is the proportion with an interactive website. TECH3 is the proportion with a transactional website.

Table 6 Hazard function estimation results

Equation	I	II	III	IV	V	VI	VII	VIII	IX	X
Sample	All	All	All	All	All	All	State	Federal	Single	Multiple
Mode of disappearance	All	Merger	Liq/P&A	All	All	All	All	All	All	All
Reason for disappearance[+]	1,2,3	1,2,3	1,2,3	1	2	3	1,2,3	1,2,3	1,2,3	1,2,3
LASSET	-.3092***	-.2932***	-.5651***	-.4391***	-.2343***	-.2845***	-.3652***	-.2858***	-.2695***	-.4365***
	(-15.93)	(-14.82)	(-6.28)	(-10.84)	(-6.02)	(-10.57)	-(11.43)	(-11.25)	(-11.10)	(-11.91)
MEMPOT	-.2813***	-.2979***	.9521*	.0157	-.6101***	-.2031	-.4684***	-.2367*	-.1580	-.4666***
	(-2.85)	(-2.97)	(1.82)	(0.07)	(-3.25)	(-1.47)	(-3.02)	(-1.83)	(-1.24)	(-2.94)
LAGE	.2555***	.2739***	-.1645	.3297**	.1750	.2635***	.1497	.3192***	.2394***	.3792***
	(3.60)	(3.77)	(-0.47)	(2.06)	(1.26)	(2.70)	(1.48)	(3.27)	(2.65)	(3.29)
ROA	-8.7800***	-9.2656***	-1.3353	-6.1376***	-9.9713***	-9.6242***	-10.102***	-8.7613***	-8.0965***	-9.7649***
	(-20.89)	(-21.83)	(-0.92)	(-7.20)	(-11.85)	(-16.31)	(-12.50)	(-15.32)	(-14.96)	(-11.53)
LIQ	.9771***	.9635***	.8493	.9822***	1.1915***	.8964***	.5918**	1.1302***	.8526***	1.4419***
	(6.53)	(6.25)	(1.40)	(3.31)	(3.90)	(4.25)	(2.43)	(5.99)	(4.79)	(5.24)
CAPASS	-2.9156***	-3.7413***	4.3956***	-.4849	-3.0019***	-4.4420***	-3.4102***	-2.3642***	-1.9259***	-6.4859***
	(-8.44)	(-10.25)	(6.43)	(-0.83)	(-3.86)	(-8.75)	(-4.96)	(-5.44)	(-4.72)	(-7.63)
NONPER	-.0288	-.0499	.6756	.6091	-2.1786***	.3790	1.8717***	-.7268*	-.0353	.7304
	(-0.10)	(-0.16)	(0.92)	(1.25)	(-2.69)	(0.89)	(3.59)	(-1.86)	(-0.10)	(1.05)
LOANASS	-.3382**	-.2786**	-2.2155***	.1519	-.6444**	-.4086**	-.4331*	-.2642	-.3468**	-.7396***
	(-2.45)	(-1.98)	(-2.84)	(0.53)	(-2.42)	(-2.09)	(-1.93)	(-1.49)	(-2.03)	(-3.01)
NINTASS	6.0106**	4.6696	-.3347	8.4463***	5.2734	2.9020	18.118***	2.0651	3.2041	12.764***
	(2.13)	(1.56)	(-0.12)	(3.10)	(0.97)	(0.61)	(3.63)	(0.48)	(0.76)	(3.56)
TECH1	-.3383***	-.3715***	.2624	-.5015**	.0059	-.5080***	-.2015	-.4167***	-.3479***	-.2216*
	(-3.82)	(-4.15)	(0.41)	(-2.27)	(0.04)	(-4.01)	(-1.40)	(-3.70)	(-2.73)	(-1.77)
TECH2	-.3797**	-.4417***	.9663	-.8675*	-.0686	-.5282**	.0843	-.8031***	-.3688	-.2313
	(-2.37)	(-2.72)	(0.92)	(-1.69)	(-0.26)	(-2.34)	(0.39)	(-3.27)	(-1.50)	(-1.08)
TECH3	-.6760***	-.7370***	-.2761	-.8361***	-.3794**	-.9662***	-.4779***	-.8040***	-.7096***	-.4413***
	(-6.91)	(-7.46)	(-0.26)	(-3.33)	(-2.27)	(-6.53)	(-3.14)	(-6.18)	(-4.80)	(-3.14)
FED	-.1989***	-.1903***	-.5219*	.1531	-.0292	-.4287***	-	-	-.2335***	-.0900
	(-3.83)	(-3.61)	(-1.65)	(1.28)	(-0.29)	(-5.99)			(-3.41)	(-1.10)
MULT	.0944*	.0929*	-.3114	-.1160	.0539	.1938**	.0161	.1423*	-	-
	(1.72)	(1.67)	(-0.73)	(-0.90)	(0.52)	(2.56)	(0.20)	(1.89)		
Observations	96984	96984	96984	96984	96984	96984	37429	59555	47756	49228
Credit unions	9569	9569	9569	9569	9569	9569	3714	5855	4800	4769
Disappearances	1620	1570	50	349	445	826	651	969	976	644

Note:

[+] Stated reasons for disappearance (see also Table 1) are: 1. Financial or managerial difficulties; 2. Expansion; 3. Reorganization or restructuring

*** Estimated coefficient significantly different from zero, two-tail test, 1% significance level. ** As above, 5% significance level. * As above, 10% significance level.